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## OVER-NUTRITION AND ITS SOCIAL CONSEQUENCES.

Observing the fact that pleasure usually arises in connection with objects that are beneficial to the organism and pain in connection with those that are harmful to it, biologists have taken it for granted that pleasure and pain, as states of consciousness, are the direct resultants of the objective stimuli with which they are associated. In the evolutionary process it is held that those organisms survive whose nervous systems react pleasurably when brought into contact with utilities, while those which do not so react are eliminated. Aside from the fact that this view furnishes no explanation of the origin of pleasure and pain, it seems to me that it does not properly account for the rôle they play in the evolutionary process. Pleasure is useful and pain detrimental, not because they reveal the qualities of objects, but because they create mental states advantageous or disadvantageous to the organism.

According to popular view the mind is a unit and controls the body through its will. In complex organisms however, even if the existence of a will be admitted, it does not exercise a direct control over the various organs. Many of them have their own nervous centres and motor forces. The great problem in the development of higher organisms, therefore, is to unify these discordant tendencies and to make the motor forces of some one centre so dominant that they control and direct all the others. This psychic control determines the power which organisms have to co-ordinate their movements for definite ends. I use this phrase, psychic control, to avoid the difficulties which discussions of the will involve. The theory of a will is an attempt to account for the facts which psychic control reveals.

But what creates this psychic control through which unity of action in complex organisms is secured? My answer to this question is that pleasure is the agent through which a subordination of many motor centres to some one centre is secured. I will therefore present a simple hypothesis to explain the way in which pleasure tends to increase the co-ordination of movements and thus to secure a better adjustment of an organism to its environment.

If an organism enters an improved environment or increases its power to assimilate food, additional motor energy is generated that must find an outlet. If this organism is already well fed, more motor energy will be generated than can be carried over the motor nerves to the muscles. Over-nutrition thus creates a plethora of nervous energy which must be used up in some way. Under normal conditions each motor current passes to some muscle and moves the body. But if the nerve reaching this muscle is through bifurcation connected with two motor centres, each of which has a store of surplus energy, a conflict will arise between the impulses coming from them. Both currents cannot pass along the single portion of the nerve at the same time. If these currents are of nearly equal strength an alternating redundant activity results in the nerves which bring the currents from the two centres to the point of juncture. All of the two currents can not be carried from this point to the muscle. The obstructed part of the one current forces back the other current and then a reaction takes place and the second current forces the first current back towards the place where it originated. An alternating discharge and recoil take place. That part of the two currents not carried to the muscle is in consequence employed in the continuation of this process. A part of each current is lost in friction without producing any bodily motion. Surplus motor currents are thus put to a use for which they were not primarily designed. This new expenditure of energy I regard as the cause of pleasure.

Over-nutrition, surplus energy, rhythmic or alternating motion, and pleasure are different steps in one series.

There are many facts which seem to verify this hypothesis. Vivid pleasures tend to paralyze or charm the person enjoying them by inhibiting the motor forces or diverting them from their normal channels. In the case of laughter a sudden transition of thought checks the flow of a motor current along its expected channel and creates a rhythmic motion in its passage along some new channel. When we feel energetic and have a superabundance of vital force all activity is pleasurable. So much motor force is generated that it cannot pass along its accustomed routes to the muscles. The accumulated energy seeks new outlets along other nerves, causing in this way the rhythmic reactions which create the feeling of pleasure.

There are thus two tendencies at work in the motor centres, the one to create pleasure, and the other to create activity. The centres which have no adequate outlets for the motor currents generated expend their energy in creating pleasure and exert but little influence on the movements of the body; while those centres having adequate outlets for their currents gradually acquire a control of bodily motions and in time determine the activity of the organism. In this way those parts of the body which assimilate more food than they need become static and lose their power to move the organism; while the other parts of the organism through this very change will become more active and grow in size. Pleasure centres are thus degenerate motor centres. At an earlier stage of development their power over bodily activity was perhaps as great as that of the present motor centres, but by generating more motor energy than can be conveyed to the muscles they are changed into pleasure centres and lose control over the body.

This degeneration of motor centres into pleasure centres is the cause of psychic control. Suppose that a low organism had four motor centres, A, B, C, D, having

equal power to determine the motions of the body. These centres would have different tendencies to produce pleasure. The best supported parts of the body would generate the most motor force. Here the outlet for the motor currents would be insufficient and hence rhythmic reactions causing pleasure would appear. If centre A were located in such a part it would degenerate into a pleasure centre and leave the control of the body to the other centres.

The same tendencies causing the centre A to degenerate into a pleasure centre would continue to operate, and in time a differentiation would take place in the remaining motor centres. If centre B now had a stronger tendency to create pleasure than bodily motions, it would also sink into a pleasure centre and leave the control of the organism to centres C and D. A further differentiation would reduce the centre C to a pleasure centre and leave the centre D in control of the organism.

The effective co-ordination of the motor centres in a higher organism is not the result of uniting the many motor centres of a lower organism under a new and higher centre. Centres A, B, C and D, do not for example become subordinated to centre E; the stronger influence of pleasure on centres A, B and C caused them to degenerate and leave centre D in control of the organism. Centre D controlled only a small part of the original organism but this part has developed until it is now the major part of the present organism. The present pleasure centres are remnants of its former rivals in the struggle for psychic control.

While the pleasure centres lose their power to move muscles they do not lose their influence over bodily activity. Their power is exerted by sending their currents to consciousness, instead of to the muscles; they create the desires and passions of the organism through the liberation of their stored-up energy. Whatever arouses their activity concentrates the attention upon their needs and thus compels the motor centres to carry out their commands. The

resulting desires and passions create a vivid impression in consciousness and arouse the motor centres needed to produce bodily motions. Pleasure not only increases psychic control but also creates the motives which control the mind; without its influence the development of the higher organisms would be impossible. From an economic standpoint the end of an organism is pleasure. From a biological standpoint, however, pleasure is a means of securing the subordination of the parts most susceptible to its influence. In this way psychic control becomes complete; the clear ideas of the mind determine the activity of the motor centres through the desires and passions they arouse.

It will add to the plausibility of my hypothesis if it can be shown that pain has a similar origin. Pain like pleasure is caused by the motor currents; it is the opposite of pleasure only in the sense that it destroys the psychic control which pleasure creates. It frees the lower centres from the control of the higher centres and causes them to act as if they were parts of a lower organism. The parts of a higher organism under severe pain move as though they had that independence which they do have in lower organisms. Each lower centre expends its energy in creating local motion instead of massing its motor force with that of other centres and thus producing well directed movements. The hand may grasp an object more firmly and quickly than if there were no pain, and the motion of the leg may be more energetic; but the two movements are not in harmony and produce no net advantage for the organism. In fact, these movements often injure the organism and may even destroy the part showing such aimless activity; the hand may grasp a knife and the leg may strike a hot body.

This destruction of psychic control is due to some derangement in the higher motor centres. The currents which should go to the lower motor centres are diverted into other channels. The only other route for these diverted

currents is over the sensory nerves. In this way the currents which should reach and control the lower motor centres find an outlet. For the time the sensory nerves are changed into motor nerves and are made to carry currents for which they are not fitted. The direction of the current in the sensory nerve is reversed and when the current arrives at the end of the nerve there is no fitting connection by which the current can be changed into muscular activity. It must break over the intervening obstacles as an electric current jumps over a break in the wire.

Pain, in my opinion, is due to this sudden transformation of sensory into motor nerves. In a rudimentary organism the sensory and motor nerves are similar and the direction of the nervous currents is almost a matter of chance. Any point on its surface can be easily moved and its position can be changed only by a multitude of slight spasmodic motions. A well co-ordinated movement is impossible since a motor current can pass to the surface over any of the nerves, thus producing many slight irregular motions instead of a few well-directed ones. In the higher animals, the motor nerves are distinct from the sensory nerves and it would be only on extraordinary occasions, or in diseased states, that the motor currents transform the sensory nerves back to their primitive condition, making them a means of creating motion at the surface instead of creating sensations at the centre of the nervous organization.

The belief that pains are due to the exit of motor currents over the sensory nerves is strengthened by the fact that activity relieves pain. It causes the motor currents to return to their normal channels and thus relieves the pressure on the sensory nerves. Groaning, crying, walking and other movements always reduce violent pains. Sorrow, depression and melancholy are relieved by any centrally excited activity. Mechanical activity caused by the lower centres will reduce pain, less than conscious activity. It is the motor currents of the higher centres that are diverted

to the sensory nerves. A new environment or a new form of exercise demanding conscious attention is, therefore, the best means of restoring the normal condition of the nerves.

That pains are due to the exit of motor currents over unaccustomed routes is also shown by the muscular activity which accompany them. These movements are not the conscious co-ordinated activity produced by motor currents from the higher centres passing to the muscles over the motor nerves. Pain distorts the body, produces irregular movements, and causes spasmodic contractions of the muscles. Motions are also produced in parts of the body not controlled by the motor nerves. In the higher organisms the motor nerves do not reach all parts of the body, and hence slight motions or tremors of wide distribution must be created by currents over the well distributed sensory nerves. The maximum of diffused disconnected activity is reached by each lower motor centre acting for itself, while the currents from the higher motor centres find an outlet over the sensory nerves. The whole nervous system is thus transformed into a motor mechanism and the organism reverts into a primitive condition, that is, a condition where there is no psychic control.

It may be that all nerves had in the beginning motor functions. The first nervous reactions were probably between the digestive and motor tissue. After the digestion and assimilation of food, surplus energy was generated which passed off through the motor nerves. The adjustment of such an organism to its environment is accidental; it has no power to protect itself from external evils. Nor can it know anything of this environment except through shocks so violent as to cause the whole organism to vibrate. With no definite routes over which these vibrations may be communicated, the weaker vibrations are not perceived or at least they are not differentiated from one another and accurate indications of outer objects are not given. Even in higher organisms these crude shocks are still



perceived and often made use of. A deaf man can often improve his hearing by holding in his teeth an object capable of propagating sound vibrations. Persons whose optic nerves are injured can still detect the presence of light. The X-rays show us how easily such vibrations pass through an organism. In similar ways many of the vibrations could affect an organism even if it had no sensory nerves. Rude shocks or the condition of the digestive tract could excite motor activity even if there were no developed sensory mechanism.

The nervous arc arises only after the motor nerves become so connected and differentiated as to create organs with definite functions. Their growth gives to certain motor nerves the control of bodily activity and thus deprives the weaker nerves and organs of their original function. The sensory nerves are these weakened, degenerate motor nerves put to a new use. No longer able to secure for themselves a part of the surplus motor energy, they become the means by which the vibration of outer objects are communicated to the nervous centres. Nervous tissue can carry these vibrations better than can the other tissue, and thus reversed currents are created which arouse the motor centres and excite them to activity. In this way a nervous arc is formed and the organisms respond to external stimuli more promptly and intelligently than they otherwise could. The primitive motor discharges are developed into sensory-motor activity, when some of the weaker motor organs are differentiated into feelers, and used to give indications of adjacent objects. The sensory organs might therefore with propriety be looked upon as the "dragging legs" of an organism. As they become less plastic and less mobile they are better able to reproduce at the higher centres the vibrations coming from outer objects. Pain aids this differentiation of the motor and sensory nerves by causing those activities to be inhibited which send motor currents to the sensory nerves. It can be said, therefore, that the

organic end of pain is to promote the differentiation of sensory and motor nerves just as the organic end of pleasure is to secure psychic control. Pleasure indicates psychic control; pain reveals its absence. As the different degrees of psychic control shade off gradually into each other, pleasures and pains seem to be but a part of a single scale and thus have the appearance of qualities.

There are, then, two distinct sources of motor activity. Its primary source is in the assimilation-motor system. The food an organism digests becomes stored up energy which is expended either in creating pleasure or in moving muscles. It is easy to conceive of a creature with no knowledge of the external world such as the sensory system gives. Its movements would be due either to the condition of the digestive tract, to violent shocks, or to the pleasure of mere activity. The last would be of the same class as play in more developed animals. It would be activity for its own sake without regard to any end that it might secure. Hunger, fear, satiety, and pleasure would be the feelings dominant in such a creature. All its adjustment to external conditions would be accidental. It could not live unless food were abundant, enemies scarce, and the dangers from natural forces at a minimum.

The end of the assimilation-motor system is life and pleasure; the end of the sensory-motor system is survival. The important objects in the external world are not the atoms and natural forces into which it may be decomposed, but the aggregates into which these atoms and natural forces are united. I use the term "aggregate" in its most general sense to include rocks, minerals, soils, seas, plants, animals, storms, moisture, climate or any other form, temporary or permanent, into which the elements of nature are united. Survival depends on the utilization of certain of these aggregates and on the avoidance of others. The sensory-motor system develops to meet this end. The sensory system pictures these aggregates and the motor system is so

adjusted to it that the proper motor reactions are excited by the presence of each aggregate. The assimilation-motor system thus begins with the digestion of food and ends in pleasure and activity. The sensory-motor system begins with vibrations coming from external objects and ends in definite motor reactions useful to the organism. The effects of the assimilation-motor system appear in consciousness as pleasure and pain, those of the sensory-motor system as clear ideas. The ideas the latter system brings to consciousness, being the more important, receive more conscious attention and can be contrasted and classified in a more definite manner. They seem, therefore, to be the fundamental series of ideas. It is easy to give them a first place and to regard the less clearly defined ideas of the assimilation motor system as mere modifications or qualities of the sensory concepts. Pleasure, for example, is thought to be a quality of colors, tastes and other sensory concepts aroused by the contact with external aggregates.

This conclusion is sound from what might be called a sensory-motor standpoint, but from an assimilation-motor standpoint sensory activity is merely a modification of motor activity. Instead of having a mass of aimless movements which cause pleasure but no adjustment, one group of motor nerves is so modified that they direct the activity that other motor nerves create. Some of the many motor organs or legs of the early forms of life degenerate into feelers that furnish indications of the adjacent aggregates and then a further generation turns them into sensory organs that give accurate information of external objects. Perception thus normally ends in complex motor reactions just as assimilation normally ends in pleasure. Life is promoted and enriched by causing the motor currents to produce pleasure while survival is furthered by using them to produce definite motor reactions.

A person eating an article of food has two series of impressions: the one, coming from direct contact with the object, creates the motor reactions we call pleasure; the other,

coming over the sensory nerves, gives a knowledge of the object and its relations to the consumer. These two series blend in consciousness, and it is therefore possible to regard either of them as fundamental, and the others as qualities. The assumption of the utilitarians that pleasures have degrees and qualities by which they can be measured, tacitly assumes that the sensory impressions are qualities of pleasures. How, for example, can anyone distinguish between first and last increments, and between initial and marginal utilities, except though the sensory impressions of the objects consumed? The doctrine of degrees and qualities of pleasure is sound so long as economic goods giving sensory impressions are under consideration, but strip an object of its sensory qualities and the definiteness of the utilitarian calculus disappears. In other words definite measurements are always in terms of clear ideas, and clear ideas belong to the sensory side of the mind. If I am right in putting pleasure among the motor feelings it can not be accurately measured except in the case of material goods which at the time they create pleasure also create a series of sensory impressions blending in consciousness with the pleasure and making it susceptible of measurement.

Another error, which has crept into the reasoning of the utilitarians, is due to the fact that they were economists. They assume that all pleasure arises from consumption and thus ignore the pleasures of activity. To an economist activity is work and work is disagreeable. So long as men are engaged in a severe struggle for existence this view is practically true. The ideal of the overworked is a haven of rest where they can repose and consume. But however true it may be that activity has disagreeable associations in the grind of an economic world, it is wrong to raise such a fact to the rank of a general principle and to base a theory of progress upon it. The incompleteness of such a generalization cramps the development of the doctrines which depend on it and creates a wrong concept of

social progress. Utilitarianism at bottom is a species of economics and has all the advantages and limitations which go with other economic investigations. If utilitarianism is sound as a moral doctrine, it is because an economic interpretation of social progress is correct.

To appreciate the progress that economic conditions create we must first of all understand how the economic struggle promotes psychic control. Assimilation, I have shown, normally ends in pleasure, and pleasure is the means by which psychic control is increased. Pleasure harmonizes the discordant motor tendencies and causes them to act together in an efficient way for the ends of the whole organism. Assimilation, the first link in the chain that leads to psychic control, demands the presence of food. Without an abundance of subsistence there is not enough assimilation to generate pleasure; and without pleasure there is no psychic control and hence no unity of action between the various parts of the organism. The underfed, being at a disadvantage, are gradually eliminated through the struggle for food.

The displacement of individuals that promotes psychic control is secured by under-nutrition. It wipes out those who have the least psychic control and leaves those with greatest psychic control in possession of the economic world. Complete nutrition and assimilation, however, can do no more than create psychic control, and when this end is secured increased consumption no longer contributes to social progress. The succeeding steps must depend on the increase of social control. All the individuals in a community must act together and obey similar impulses. There must be the same unity of action and harmony of motives in society that psychic control creates in the case of individuals.

In looking for the causes of social control we need not go outside the field of economics. The same causes are in operation, but they show their effects in another way. At

bottom the difference between the new form of progress and the old is that psychic control is improved by the elimination of the underfed, while social control is created by the elimination of the overfed. A more striking way of putting this contrast would be to say that men are killed off either by starvation or by dissipation. The underfed starve and the overfed lose their economic advantage through indulgences that weaken their psychic control and reduce their energy. Over-nutrition is as dangerous as under-nutrition and fully as fatal. Through the increase of psychic control and the industrial efficiency that goes with it, men are able to secure more nutrition and thus approach the line of complete nutrition; but this line must not be crossed. To avoid the latter evil the surviving part of society modify their consumption so that even with their increased efficiency they never cross the fatal line.

It should be noticed that survival depends upon two conditions. In the direct struggle with their fellows those have an advantage whose energy and psychic control is the greatest and this, in economic terms, means those who have the greatest productive power. This advantage is lost or turned into a disadvantage if so many goods are produced that their consumption leads to over-nutrition or to any form of over-stimulation. Social progress, therefore, demands a steady improvement in psychic control through which the productive power is increased and a corresponding modification of consumption in such ways as will avoid over-nutrition. These two ends are harmonized only through an increased variety of consumption.

Every increase in this variety creates new motives and thus stimulates an increase of psychic control and at the same time the more refined forms of consumption give less nutrition in each of its parts and thus the new whole, although larger and more varied, is not the source of over-nutrition.\*

\* For a full statement of this thought the reader is referred to the writer's monograph on "The Consumption of Wealth." Publications of the University of Pennsylvania.

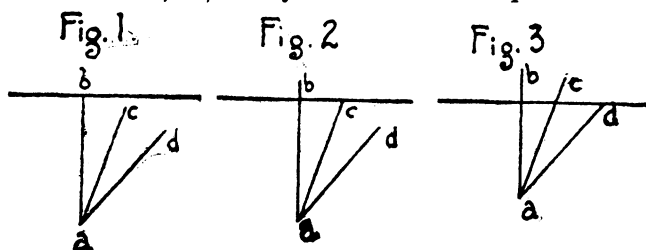
No matter how great the efficiency and energy of an individual he can always avoid crossing the line of complete nutrition by modifying his consumption so as to include in it a sufficiently large number of ingredients. Any increase of efficiency among the wellfed must result in over-nutrition if the intensity of old wants is not reduced and if new ones of greater intensity are not acquired. Those who persist in the old habits fall victims to dissipation and disappear. The surviving portion push along the line of complete nutrition and acquire habits, instincts and inclinations that prevent them from crossing the line of over-nutrition. The socialization of men is the result. Every increase in the variety of consumption creates new bonds between the various members of society and prompts them to create new institutions through which a more complex life can be enjoyed without the temptation of over-indulgence. The original economic aggregates into which men unite for industrial ends are thus transformed into true societies where new habits and modes of thought are acquired.\*

The moralization of men has the same cause. The purely selfish man uses his increased psychic control to satisfy his personal wants. This tendency leads to over-nutrition and dissipation as soon as his industrial efficiency is enlarged. The most selfish among the wellfed are gradually weeded out and the surviving part of society becomes more altruistic. The inefficient man may be greedy and lustful and still survive, strong motives being needed to keep him at work. Greed and lust must, however, decrease with the increase of productive power. The more efficient will suffer from the over-nutrition which an enlarged income permits, or fall victims to dissipation and vice.

In the diagrams let the horizontal line be the line of complete nutrition, which must be reached but not crossed.

\* See the writer's "Theory of Social Forces," pp. 85-90. Publication No. 163 of the Academy. Also issued as a supplement to the ANNALS, January, 1896, Vol. vi, No. 1.

The length of the vertical lines shows the amount of productive power and hence the income of three individuals—*ab*, *ac* and *ad*. The slant of these lines shows the amount of their altruistic effort, and hence the amount of skill and energy which is not centered on themselves. In Figure I, where the productive power and income is small, the most selfish of them, *ab*, will just command complete nutrition



and will not be injured by his selfishness although full of greed and lust. The other two cannot survive under these conditions, because their energies being partly used for the benefit of others leaves them short of complete nutrition. In Figure II where the productive power of the three men is greater, the most selfish, *ab*, will indulge in dissipation and be eliminated. A less selfish man, *ac*, now survives, but the more altruistic man, *ad*, still fails to secure complete nutrition. When, however, the productive power of these men is again increased (Figure III), the more altruistic man, *ad*, can hold his own. Both the others will cross the line of complete nutrition and suffer from over-nutrition. Every subsequent increase of productive power and income must produce similar effects and make a higher degree of altruism necessary for survival. The moralization of men thus accompanies their socialization and the two when united form the main bulwark against over-indulgence and dissipation.

These facts show that psychic control and social control are parts of the economic process by which an adjustment to external conditions is acquired. If a people have been



for a long time subject to the dangers of starvation they acquire great psychic control; if they are continuously exposed to dissipation, to vice and to the evils of over-nutrition, they gain additional social control. There is thus a measure of both these agents in the objective conditions which determine the consumption of each race. At bottom they are problems of nutrition and capable of the same treatment as other economic problems. To isolate them from their economic background is to deny them the possibilities of scientific discussion and to introduce an irrational element into the discussion of social problems.

A notable example of this tendency is furnished by Mr. Kidd's "Social Evolution." There is never, he thinks, any cessation of that strenuous process by which the least efficient are exterminated. Competition and rivalry necessarily result in the suffering and failure of a large part of those struggling for life. Those who fail have no share in the social progress secured by their elimination and their welfare demands that it cease. The interests of individuals and that of society are therefore irreconcilable. Reason would ultimately stop all further progress if it were not controlled by religion. It should be noticed that this reasoning assumes that the elimination takes place only among the underfed. The thought is emphasized that the unsuccessful are battling with hunger. Want, misery and failure are on every side and to their effects all social progress is due.

Even if these facts be admitted social progress cannot be attributed to them. Over-population and misery, by eliminating the least efficient, may promote psychic control but they never create social control. There are variations among the wellfed as well as among the underfed and the same struggle exists among these varieties as among the underfed. The more selfish exploit present conditions and are eliminated through the effects of over-nutrition. The less selfish vary their consumption and enter into new social relations to check their tendencies towards over-indulgence.

Mr. Kidd assumes that selfishness and the resulting over-indulgence among the wellfed have a rational sanction, but that a varied consumption which prevents over-nutrition has no sanction. This odd conclusion shows a lack of knowledge of economic science and of the utilitarian calculus upon which it depends. It is so much in the wrong that the opposite of it can easily be proved. It is the irrational man who is selfish and chooses present indulgences. He only is rational who avoids them. He lengthens his life and increases the sum of his happiness by a varied consumption through which over-nutrition and its evils are prevented.

It is not, therefore, for the interest of the lower classes to stop progress; the exploitation of the masses does not advance civilization, nor is it a necessary feature of progress. If this exploitation should cease and the evils of poverty be remedied there would still be a tendency to create variations among individuals, and those who avoided the evils of over-nutrition would have an advantage. The race under these conditions would advance more rapidly than before. The weeding process exerted by over-nutrition and dissipation fails to work among those who suffer from poverty and starvation.

The social consequences drawn by such writers as Mr. Kidd depend upon a defective statement of the theory of evolution. Premises definite enough for the purposes of biology become inadequate when used in social philosophy. The reasoning of Darwin is usually stated in this form:

- 1st. The rapid multiplication of the species.
- 2nd. The struggle for existence.
- 3rd. The survival of the fittest.

There is a lack of sequence between the second and third step. Logically the struggle for existence only ends in the survival of the wellfed. A wellfed animal may perhaps be called a fit animal but the same cannot be said of a wellfed man. It is the social and not the bodily qualities of a man

that determines his fitness. To meet this new condition the steps of reasoning must be modified as follows:

- 1st. The rapid multiplication of the species.
- 2nd. The struggle for existence.
- 3rd. The survival of the wellfed.
- 4th. The degeneration of the overfed.
- 5th. The modification of desires.
- 6th. The survival of the fittest.

Another defect in the reasoning of the biologists is a source of error if overlooked by those who would apply this reasoning to social affairs. The appearance of variations and the struggle for food may account for the rise of new species, but it does not account for the permanence of types. The struggle for existence by cutting off the underfed would by itself create a moving equilibrium but not the stable characteristics which static species show. Biologists have been more interested in the rise of new forms of life than they have been in the question as to why certain types persist. It is necessary, however, to explain not only the origin of species but also the causes for the persistence of certain species, little modified by the struggles for existence of their members.

An enduring species must be acted on by more than one force. An equilibrium results when two forces counteract each other. The elimination by under-nutrition, if operating alone, would soon change the character of a species. This change of type is checked by any process which cuts off the variations which the elimination of the underfed promotes. A permanent type must be under two restraints which so limit the possibility of variations that the main peculiarities of the type are preserved. Then only those variations can perpetuate themselves which are in harmony with the main conditions upon which the success of the type depends.

Among men the two restraints on variation giving stability to men's characters are under-nutrition and over-nutrition. By eliminating both extremes among men they

tend to reduce men to a single type. There is a leveling up to the standard of this type by the destruction of the underfed and a leveling down to this standard by the destruction of the overfed. The net result is a uniformity of character and an equality of conditions. The farther this process is carried the more social men become. There arises a vivid consciousness of kind and an intense admiration of democratic ideals. By these means the race is bound together and the motives created that induce individuals to subordinate their interests to those of the public. There is, however, nothing irrational or even non-utilitarian in the process. The adjustment to planetary conditions is economic and is determined by the conditions of consumption.

A theory of consumption includes all the means by which men acquire intenser motives and desires without overstimulation or over-nutrition. The whole economic process thus includes many distinct processes some of which lie in a field seemingly apart from it. There is first the process of psychic concentration or psychic control through which a unity of action is acquired. Akin to this is the process of visualization which includes the sensory mechanism through which the environment is objectified and clear ideas of it acquired. There is also the process of pleasure objectification. Pleasures are motor phenomena. If they appeared in a pure form, they would seem incommensurable and isolated from the economic goods upon which survival depends. When, however, pleasures are blended in consciousness with the sensory concepts arising from contact with material objects they seem to be objective and capable of comparison through the sensory concepts associated with them. They thus become measurable motives and the source of conscious endeavor. There is next the process of industrialization, which includes all attempts to minimize efforts and to reduce the amount of pain. These topics are fully treated in ordinary economic textbooks and need no further emphasis. The final processes are those of

socialization and moralization. They represent the last stages in the process of adjustment and when they are complete the goal of economic progress is reached.

At first sight this view of economics seems to make it an all-inclusive science. A closer examination, however, shows that as much has been cut out of it as has been added to it. The very definiteness with which the economic process is conceived shows that it must be supplemented, even though sociology and morality are not the supplements demanded. What we need is not a higher science but one that treats of more elementary phenomena—the ultimate psychic causes upon which the economic process depends.

It would be well to contrast the economic self which utilizes the environment and aids organisms in their adjustment, with the non-economic self whose activity is purely motor and whose end is more than mere adjustment to planetary conditions. The first is the self of the sensory-motor system; the second is the self of the assimilation-motor system. This second self is inherently as capable of development as the first but it cannot develop so long as economic conditions dominate the organism and limit the scope of its evolution. It must therefore remain in a rudimentary condition while men are in an economic world and struggling for survival.

There is, however, always a fringe of activity due to pure motor tendencies, even for those deepest immersed in practical affairs. This fringe is largest and most noticeable in the case of children. In them pure motor activity becomes play and thus a wider range of motor activities is encouraged than is demanded by the sensory environment upon which survival depends. Play is not due to survival impulses but to pure assimilation-motor impulses; the desire of activity for its own sake and not for the protection or benefit which it may afford. Such activity is more elementary and comes earlier than that of the sensory-motor impulses created by planetary evolution. Could it become the dominant activity the non-economic self would reveal

its possibilities and a series of social and moral sciences would appear independent of those that the economic process has created. As it is, however, this series of sciences being merely an embryological possibility is a source of confusion. There is a strong tendency for investigators to start with the rudimentary phenomena of this series and to patch them out with the more definite phenomena due to the sensory-motor activity of the economic world. Such attempts give a wrong notion of the lines along which the non-economic self would develop if it were free from the domination of economic conditions and at the same time give a false basis for the social and moral development of existing societies. The result is that the social and moral sciences are severed from the economic process of which they are a part and grafted on the rudimentary stubs of the possible sciences in these fields which the activity of the non-economic self might create.

It would be nearer the truth to recognize that individual variation comes from the activity of the non-economic self but that social types have an economic origin. An individual variation cannot develop into a type unless the variation is the source of some economic advantage. A non-economic variation cannot perpetuate itself and hence fails to transform itself into a type, and without social types there can be no developed forms of society or of morality. The non-economic self can do no more than produce individual variations. Only the economic self can determine whether these variations are suited to its ends, and thus capable of being transformed into a social type. To one of these selves all variations are due and to the other all the social types. They thus supplement each other and create a progress of which either by itself is incapable. It may sound paradoxical to say that economic progress is due to non-economic impulses, yet the statement contains a truth which it is difficult to express in other terms.

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